AGRICULTURAL NEWS LETTER

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THIS PUBLICATION GIVES INFORMATION on new developments of interest to agriculture based on the work done by scientists and agricultural field men of the du Pont Company and its subsidiary companies.

It also gives reports of results obtained with products developed by these companies in the field whether the tests are made by field men of the companies, by agricultural experiment stations or other bodies. Also data on certain work done by agricultural stations on their own account and other matters of interest in the agricultural field.

This issue contains:

Issued by
Publicity Department,
E. I. du Pont de Nemours & Co.,
Wilmington, Del.

THE FIRST COMPLETE BIBLIOGRAPHY ON FORMALDEHYDE FOR SEED AND SOIL TREATMENT READY TO DISTRIBUTE

Since the discovery of formaldehyde, one hundred years ago, the literature dealing with its chemistry and uses has grown to tremendous proportions. Work has been carried on in all principal countries and the results published in many languages. As a result, the research worker beginning an investigation has been compelled to delve into a vast accumulation of data, much of it irrevelent to his particular problem. Because of this, there has been great need for the organization and classification of the data relating to seed and soil disinfection.

Similarly, the practical man, seeking a remedy or an improvement for a given condition, has been vitally interested in finding out what has been done before. He has frequently wanted to know if formaldehyde had been tried and if so the conditions under which the experiments were carried on.

To meet the situation, a bibliography on formaldehyde for seed and soil treatment has been prepared. It is intended for the ready reference of technical workers in federal and state agricultural departments, agricultural colleges, experiment stations and private institutions, and field service men and practical growers, as well.

This bibliography should prove useful and should lighten the burden of those contending with the enormous losses which agriculture suffers because of plant diseases and other destructive causes. It is also hoped that the abstracts given, by stimulating new researches, will develop to an even greater extent the uses of this effective disinfectant, fungicide and deodorant --formaldehyde.

Because of the great number of references and cross-references, this bibliography will be issued in sections. The sections may be obtained without cost on request. The blank below is for the convenience of those who desire to receive the sections as they are ready for distribution.

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Agricultural News Letter,
E. I. du Pont de Nemours & Co.,
Wilmington, Delaware.

Please send me, as issued, the sections of the Bibliography on Formaldehyde for Seed and Soil Treatment.

Mr.(or Dr.) .....

Address.....

Town..... State.....

THE ESSENTIAL SIMILARITY OF COMMERCIAL RESEARCH AND THAT DIRECTED BY STATE AND FEDERAL AGENCIES

EDITOR'S NOTE:- This is an illuminating discussion of a matter about which there seems to be considerable misunderstanding. The paper was presented by Dr. Dietz at the Fifteenth Annual Meeting of the North Central State Entomologists, Ames, Iowa, March 5-6. The subject assigned was "Commercial Research Versus State and Federal Research."

By Harry F. Dietz, Research Entomologist,
Grasselli Chemical Company, Cleveland, Ohio

Ever since I received the program of these meetings, I have wondered who suggested the title, "Commercial Research vs. State and Federal Research", and whether there were any implications in its wording. The word "versus" puzzles me. In order not to be led astray by my own possible misconception of the definition of this word, I took recourse to Webster's Unabridged Dictionary. I found the following definition "Versus: against used in legal or sporting language, hence considered in contrast to or as an alternative of." This definition does not help much in that it implies verbal or physical encounters, or figuratively, diametrically opposed ideas on the same subject. At best, comparisons are also implied and I cannot forget the adage on comparisons.

It occurred to me that perhaps one reason that I was chosen to discuss this subject is because I have served in all three capacities, and that some one was curious to know what I thought of each.

Why anyone should think that there is great difference between commercial and state and federal research I do not know. Economic entomology is an applied science and except in its subject matter falls in the same category as applied chemistry and physics.

The ultimate goal in economic entomology is better insect control by whatever means available, whether chemical, physical (mechanical) or biological. An outstanding misconception regarding state, federal and commercial research, implies that the commercial investigator is restricted in his choice to the first two fields whereas the state and federal investigators have an unrestricted choice.

It is true that those commercial entomological investigators who are employed by the chemical industry (insecticide manufacturers) or those who are employed by the manufacturers of insecticide applicators are for the most part so restricted. It does not apply to those commercial research entomologists engaged by large fruit and vegetable producing or canning agencies; those engaged in parasite production or collection; or those employed by private control agencies.

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Commercial Research Advantages

By far the greatest number of entomologists engaged in commercial research are at present employed by the insecticide manufacturers. The field of activity of any one investigator is at least partly restricted by the type of insecticides that are made or can be made by his employer.

However, taken as a whole commercial research in the chemical control of insects is limited only to the extent that chemical industry is limited. We may, therefore, say that commercial research in this field is no more restricted than that of state or federal research. Furthermore, in this field the commercial research entomologist has as his guide and constant counsel not one but usually several outstanding chemists and in this respect is more fortunate than many of his state employed colleagues.

It might be said that commercial research, since it is applied and practical, becomes merely a testing routine. This is true to a certain extent. However, it must be considered that the commercial investigator must constantly compare his product not only with those accepted as standard controls but also with the best new products produced by competitive companies. Moreover, in many instances the products tested by the commercial man are absolutely new; thus, he becomes a real pioneer.

Perhaps it is here that an outstanding difference between commercial and state and federal research insect control investigations may exist.

The Wide Range of Commercial Research

Another possible difference is that the individual state and federal investigators test the cream of the possible control materials on a single or at most a few insects, whereas the commercial investigator tests his products on as many different insects as possible in order to determine the range of their usefulness.

State and federal research investigators usually work in restricted areas and on definitely restricted problems. However, the distribution of insecticides is country wide and this presents one of the pitfalls that the commercial investigator must avoid. He must be cautious and avoid making unwarranted claims for any of his products until and unless he or some of his colleagues have tested such products over wide areas. The reason for this is that we have very definite and wide ecological areas in the broad expanse of this country over which we have superimposed a man-made agriculture. Therefore, those factors that have governed the natural distribution of plants and animals in these areas may also influence the insecticidal and phytocidal effects of a given insecticide.

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Opportunity for Biological Work

It may be supposed that the commercial investigator has comparatively little opportunity to do biological research. In his laboratory testing he often requires immense numbers of insects. These he must rear and in doing so he has ample opportunity for biological work in this particular field. Likewise, in testing out various techniques, he must avoid any influences that produce excessive mortality in the controls. This requires considerable inquiry into factors which influence natural control.

In his field tests, the commercial investigator has ample opportunity to use his biological insight to the fullest extent in order to determine how environmental factors are influencing the results that he obtains. Without such knowledge he can readily attribute good results to the wrong cause.

As for techniques and methods the commercial investigator must use the best that have been developed in any field and which are applicable to his particular problem. If by chance he enters a new field he must develop his own methods which has been done. He must then go further by checking in every possible way the validity of the results and the dependability of the method by which they were obtained.

Every new product must be thoroughly standardized and in this work the biological method is the only one available at present. It is extremely hazardous for one lacking in biological training to attempt such work.

I have set forth the supposed differences that may exist between commercial and federal and state research. I fail to find any real differences. Is there not great similarity in the training of the investigators; the methods and the techniques employed and in the ultimate goal sought?

The advances that have been made in chemical control and those that will be made in the future are not and will not be the work of federal, state or commercial investigators working independently, but in the end the cooperative efforts of all. Therefore, I would omit the word "versus" from the title.

PRESENT SHORTAGE OF GOOD SEED CORN CAUSES CONCERN IN CORN BELT AND OTHER LOCALITIES

EDITOR'S NOTE:- Facts and opinions relative to a marked shortage in the available supply of seed corn are presented here. The results of surveys and the considered judgment of authorities combine to stress the seriousness of the situation. However, Mr. Miles points the way to reducing losses by taking advantage of germination tests and seed treatment.

By G. F. Miles, Chief Plant Pathologist,
Bayer-Semesan Company, Wilmington, Del.

The attention given to the 1936 corn crop before planting time is almost certain to be far more important this year than anything the corn grower can do after planting. Unfavorable weather conditions last fall and during the winter months are responsible for a scarcity of good seed corn, which may be even worse than the 1917-18 shortage.

As an example of what corn growers are facing, consider the results of a survey by Dr. C. T. Gregory of Purdue University, Indiana, as recorded in THE GRAIN DEALERS JOURNAL. Samples of seed corn from 254 farmers in 74 counties were germinated. The average germination was 92.4%, a figure which, while rather low for good seed corn, still gives no inkling of the low quality of the samples. There were 44.3% moldy kernels, 17.5% weak kernels and 3.3% infected with Diplodia. Since these are average figures, one can easily imagine the condition of the poorer lots of seed.

From Missouri comes the report by C. A. Helm of the Missouri College of Agriculture that "there is a definite scarcity of dependable seed corn in Missouri as well as in adjoining states."

Professor Helm says, "Germination tests on samples of seed corn submitted by various agencies indicate a serious situation. Many lots tested in December and again in late February show a decline in germination of from 10 to 25%. It is not unusual for lots to germinate as low as 70% and many lots germinate below 60%. These samples presumably represent the best lots that are available."

WALLACE'S FARMER AND IOWA HOMESTEAD reveals a similar situation in south-central Iowa, where corn growers will have to obtain seed corn from outside sources. Tests in the counties and in the seed laboratory are said to reveal germination as low as 5%.

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THE WISCONSIN AGRICULTURIST AND FARMER reports that, "The seed corn situation is declared by crop reporters to be rather unsatisfactory in outlook for the coming spring. A large quantity of seed corn was picked last fall, but weather conditions were poor and much of the seed is proving of poor germination, unless it was carefully dried. Testing of seed should be done now to be sure of its quality."

Ralph F. Crim in THE FARMER writes, "As I view the situation at the present time, I do not believe it is quite as serious as in 1917-18, but nevertheless, it is very serious and it behooves every one to examine his supply of seed corn immediately. We must get the old rag doll and work it vigorously."

From THE PRAIRIE FARMER comes the statement by O. P. Tiemann, veteran seed expert, "After testing thus far more than 100,000 ears from various parts of the corn belt, I believe the situation is almost as serious as it was in 1917. Seed corn is not only testing far below the average in germination, but the good ears have been somewhat weakened by the December freezes due to the late season and much moisture in the corn."

An editorial in THE OHIO FARMER warns of the folly of spending "time, effort and money in preparing a field carefully, fertilizing it well, and then planting in it seed that will not grow."

According to this authority, "Reports of tests, at various points in the state indicate that germination may run below 50% under the same conditions that growers have had 90% germination in previous years."

Germination Tests Important

To meet the situation indicated by these widespread reports, corn growers must do more than careful crib selection to secure good seed corn in 1936. The only way to be certain this year of planting seed corn which will germinate vigorously is to test it. Testing seed corn is not a difficult operation, requires no elaborate equipment, and will pay big dividends. The old saying among corn growers that, "A good stand is half the battle", will be worth remembering.

That good seed corn cannot be secured by crib selection alone, is a fact well-known to careful corn growers. Concrete evidence of the inadequacy of this method of selecting seed corn is furnished by the results of a contest conducted by County Agent McKinsey of Louisa County, Virginia and reported by Extension Agronomist W. H. Byrne in THE VIRGINIA FARMER. Corn growers were asked to select 100 ears of good seed corn from their crops after harvest. The ears selected were then tested to determine their suitability for seed purposes. The winner of the contest selected only 84 ears fit for seed, which means that 16 out of each 100 ears were not fit for planting.

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The lesson to be learned from this contest and from countless other similar experiences of the past is that selection of ears from the crib is not a reliable method of obtaining good seed corn. Growers who depend on this method of securing seed corn this year will in many cases find it necessary to replant.

The Value of Seed Treatment

The practice of treating seed corn with a dust disinfectant before planting has become well established in the corn growing areas, and growers are aware of its beneficial effects in improving stands and yields. While seed corn treatment is likely to be even more profitable than usual in 1936, growers should bear in mind that no disinfectant can restore life to dead kernels. An effective disinfectant will help to improve stands by checking seed-borne and soil-borne molds, which are often responsible for seed decay, seedling blights and root rots; but more than this should not be expected of seed corn treatment. Weak kernels, if treated, will in many cases produce a plant; but, if untreated, they often will decay and fail to grow. A combination of testing and treating will be the corn grower's best means of securing a good stand in 1936.

REDUCING THE COST OF COTTON FERTILIZERS SHOWN FEASIBLE BY RECENT INVESTIGATIONS

EDITOR'S NOTE:- Anything that tends to increase the margin of profit on an agricultural commodity by reducing the production cost must be of interest not only to growers but also those concerned in an advisory capacity or otherwise. For that reason the facts set forth by Dr. Parker are certain to attract attention.

By F. W. Parker, Agronomist, Ammonia Department,
E. I. du Pont de Nemours & Co., Wilmington, Del.

The Division of Fertilizer Investigations of the Bureau of Chemistry and Soils, United States Department of Agriculture, has reported studies of retail fertilizer prices for the years 1934 and 1935. Some of their data were discussed in the March, 1935 issue of the Agricultural News Letter. A second paper, "Methods of Reducing the Retail Cost of Cotton Fertilizers," was published by Ross and Mehring in the 1935 Year Book of "Commercial Fertilizer." This article is based on that paper. All figures given are taken directly from the Ross-Mehring article or were obtained by various simple calculations from figures given in their paper. A reprint of their paper will be furnished on request to the Editor.

Factors that Determine Cost

In their paper Ross and Mehring indicate that the following factors determined the delivered to the farm-time price of standard mixed fertilizers in North and South Carolina in the spring of 1935. Slightly different values prevailed in other southern states.

Basic cost*	$13.73 per ton
Organic, water-insoluble nitrogen	6.00 " unit of 20 lbs.
Water-soluble organic and inorganic nitrogen	1.68 " " " " "
Available phosphoric acid	0.65 " " " " "
Water-soluble potash	0.50 " " " " "

They also indicate that the delivered to the farm-time price of nitrogen in nitrate of soda was $2.63 per unit of 20 pounds.

The cash prices were from 12 to 15 per cent lower than the time price.

Cost of a Common Method of Fertilization

Cotton is frequently fertilized with a mixed fertilizer analyzing about 3-8-4. One-fifth of the nitrogen is usually from water-insoluble organic sources and four-fifths from soluble organic or

inorganic sources. After the cotton is up and chopped, it is side-dressed, usually with sodium nitrate, so that the total application of fertilizer is equivalent to the use of a 6-8-4 mixed fertilizer. Under that method of fertilization, the cost of one ton of the 3-8-4 plus sodium nitrate to make it equivalent to a 6-8-4 would be as follows:

Cost of 3-8-4

Basic fixed cost per ton	$13.73
0.6 unit insoluble organic nitrogen at $6.00 per unit	3.60
2.4 units soluble organic and inorganic nitrogen at $1.68 per unit	4.04
8.0 units phosphoric acid at $0.65 per unit	5.20
4.0 " potash at $0.50 per unit	2.00
Total cost of 3-8-4 per ton	$28.57
3.0 units nitrate of soda for side-dressing	7.88
Total cost of 6-8-4 per ton	$36.45

Cost of a Proposed Method of Cotton Fertilization

Numerous experiments have shown that when fertilizers are made non-acid forming, soluble organic and inorganic sources of nitrogen are just as efficient and frequently more efficient than water-insoluble organic sources of nitrogen. Furthermore, experiments show that water-soluble organics and many sources of inorganic nitrogen are very resistant to leaching and can be applied in advance or at the time of planting without serious danger of loss by leaching. It has, therefore, been proposed that cotton be fertilized before or at planting with a 6-8-4 fertilizer in which all the nitrogen is derived from water-soluble organic or inorganic sources. The cost of such a fertilizer would be as follows:

Cost of 6-8-4

Basic fixed cost per ton	$13.73
6.0 units soluble organic or inorganic nitrogen at $1.68 per unit	10.08
8.0 units phosphoric acid at $0.65	5.20
4.0 " potash at $0.50	2.00
Total cost of 6-8-4 per ton	$31.01

This method of fertilization would reduce the cost of fertilizer from $36.45 per ton to $31.01 per ton of 6-8-4 or its equivalent. This is a saving of $5.44 per ton. If the fertilizer were paid for with cash early in the season, the cost would be $30.98 and $26.36 respectively, a saving of $4.62 per ton. In the first

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method of fertilization, the nitrogen cost $15.52, in the second method it cost $10.08. In addition to this saving in the cost of fertilizer nitrogen, there is a saving of the labor involved in applying the side-dressing.

This method of fertilization has been proposed and recommended by the United States Department of Agriculture and the Alabama Agricultural Experiment Station. If it is followed, the fertilizer, for instance 6-8-4 or other grades recommended for the region, should be non-acid forming, unless it is used on land that has been limed. All of the nitrogen should be derived from soluble but leaching-resistant sources, such as urea and ammonium sulphate.

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* The basic cost includes the cost of bags, labor, freight, taxes, dealer's commission, overhead, profit and other items that are independent of plant-food content. This cost is about the same on all fertilizers and fertilizer materials.

AGRICULTURAL COMMODITIES USED IN VOLUME BY DU PONT IN THE PRODUCTION OF DIVERSIFIED CHEMICAL PRODUCTS

EDITOR'S NOTE:- The prediction of several years ago that eventually "the factory stomach will consume more of the products of the farm than does the human stomach" now seems more a thing of substance than the alluring vision this forecast was taken to be when uttered. What follows is, at least, an indication of the growing interdependence of industrial chemistry and agriculture.

Faculty members and students of so many colleges and universities have expressed a desire to be given information on "the kinship of Du Pont products" that it has become necessary to prepare a diagrammatic chart and descriptive text. The section devoted to agricultural products used as raw materials in industrial chemical manufactures is reprinted here.

Cotton - 16,500,000 pounds of cotton, representing the yield of 100,000 acres, are used annually for the manufacture of such products as "Fabrikoid" coated fabrics for book bindings, pocketbooks, tablecloths, upholstery materials, and luggage; also rubber-coated fabrics including raincoat materials, hospital sheeting, "Rug Anchor" and "Ventube" mine-ventilation tubing.

Cottonseed Oil - 700,000 pounds of cottonseed oil, representing the oil yield of 18,000 acres of cotton, are used annually in manufacturing various du Pont chemical products, notably those belonging to the fabrics and finishes classifications.

Cotton Linters - 36,000,000 pounds of cotton linters, representing the linter yield of 2,175,000 acres of cotton, are used annually in the manufacture of such products as "Pyralin" and "Plastacele," which are employed in the manufacture of safety glass, toiletware, lampshades, scuffless heels, fountain pens and other items; "Cel-O-Glass," used in poultry houses and cold frames; smokeless powders for shotgun, rifle and pistol ammunition made by Remington, Peters and other well-known manufacturers; "Acele" yarn for high-grade dress fabrics, finished garments; men's and women's suit linings, and other uses; "Duco" Household Cement; commercial motion picture film; X-ray film; "Duco" and "Fabrikoid."

Corn Products - From 36,000,000 bushels of corn, representing the yield of 1,400,000 acres. These products are used annually in the manufacture of such commodities as explosives for construction, mining, and agriculture; and solvents for paints, varnishes and other finishes.

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Wood Pulp - 38,000 tons of pulp from thousands of acres of timber are used in the manufacture of such products as rayon yarn for dress fabrics, finished garments, upholstery fabrics; and "Cellophane" cellulose film, widely used as a wrapping material and for drapes, homecraft articles, lampshades, handbags, hats and the like.

Molasses - 40,000,000 gallons of molasses, representing the yield of 200,000 acres of sugar cane, are used annually in the manufacture of alcohol, a solvent with many industrial uses; Du Pont Denatured Anti-Freeze Alcohol, and Du Pont "Five Star" Anti-Freeze.

Vegetable Oils - 23,000,000 pounds of oil extracted from flax-seed, soya beans and tung nuts representing the annual yield of 136,000 acres of land. These oils are used in manufacturing such products as "Dulux" finishes for refrigerators, automobiles and boats, the maintenance of plant machinery and building interiors, and for "Duco" finishes.

Turpentine and Rosin - 6,500,000 pounds, representing the yield from thousands of acres of Southern pine trees and stumps. Turpentine is used extensively in the manufacture of synthetic camphor, which is employed in making combs, handbags, hair ornaments, motion picture film and other products. Both turpentine and rosin are used in making paints and varnishes.

The foregoing data show that the du Pont organization is a good customer of the farmer. Meanwhile, du Pont contributions to the business of farming are explosives for development operations; seed disinfectants of various kinds; insecticides, fungicides and fertilizer ingredients; paints, varnishes, lacquers and an extended list of other materials, many of which the farmer never knows by name, for their identity is lost in the processes of manufacturing things that he uses daily.

In a word, the kinship of du Pont products has its parallel in the close relationship existing between the chemical industry and other industries. They are all contributors to and beneficiaries of the work and services performed. And the ties that bind each to the other are helping to achieve the objective expressed in the phrase, "Better things for better living...through Chemistry."

LABELS FOR TEMPORARY OR PERMANENT MARKINGS ARE NOW MADE OF AN INDESTRUCTIBLE MATERIAL

EDITOR'S NOTE:- The plastic used in making these labels is the same material of which a wide range of articles are made. Among the purposes for which it is used is the manufacture of toilet accessories, buttons, fountain pens and many other things.

Increased recognition of the importance for marking plants, trees and shrubs with identification labels has resulted in the demand for millions of these labels annually.

Satisfactory results, particularly on the part of commercial growers, are obtained in many cases by the use of wood or paper labels for temporary markings. But, obviously, such labels are unsuited to the purpose of lasting identification when exposed in the open.

Experimenters, fruit growers, nurserymen and others have experienced considerable difficulty in keeping records on a permanent basis because of the lack of the proper type of label. However, there is distinct need for a durable kind of label to use for hybridizing records and other experiments.

Indestructible Labels Now Available

With a view to making available labels that would meet the every requirement for temporary or permanent use, various materials have been tried. Experiments and service tests have shown that labels made of *"Pyralin" are virtually indestructible. This material, it has been found, will withstand the effects of the sun, rain and snow. It is waterproof and, therefore, mud will not soil it. For these reasons this material is peculiarly well adapted for use in making labels for indoor or outdoor purposes.

For temporary markings, a lead pencil or pen and ink may be used for writing on "Pyralin", (though, of course, a label for which ink is used will not stand exposure to water). If desired the writing may be erased and the labels used over any number of times.

Pyroxylin ink, which cannot be erased and is impervious to water, can be used for permanent markings.

These labels are made in a number of shapes and sizes, including pot markers and tree labels. Copper wire is used for attaching labels where necessary. This prevents the loss of labels, as might result from the use of steel wire that would rust.

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"Pyralin" indestructible labels are now in wide use by agricultural colleges, experiment stations and commercial growers of all classes.

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*"Pyralin" is a registered trade name of the Du Pont Viscoloid Company, 350 Fifth Avenue, New York, N. Y.

THE USE OF DYNAMITE TO DRAIN FARM FIELDS FLOODED AND WATERLOGGED BY MELTING SNOWS

EDITOR'S NOTE:- With the condition of drainage systems described as "deplorable" and farm lands in some sections so flooded that planting will be seriously retarded unless corrective measures are taken, this article by an agricultural engineer and explosives expert should prove helpful to all concerned as to the present situation.

By L. F. Livingston, Manager,
Agricultural Extension Section,
Explosives Department,
E. I. du Pont de Nemours & Co.

The present outlook is that in some sections of the country excess water in the ground and flooding will retard Spring plowing and planting. Snows and long-continued low temperatures, which prevented melting, are responsible for the condition. With the water from the snow forming ponds in fields and making the ground soggy, farmers will be delayed in getting on their lands. Late planting or the need for replanting may cause delays of two, three or more weeks. Such a condition easily could mean heavy losses.

Condition of Drainage Systems Deplored

Drainage systems in many localities are in bad shape. This fact complicates the situation. John G. Sutton, a district engineer, Bureau of Agricultural Engineering, United States Department of Agriculture, says: "During the depression, very little maintenance work was done on drainage improvements, and many drainage works have fallen into deplorable condition. Ditches have become completely overgrown with brush and trees, and the capacity of many neglected channels has fallen to one-half or even one-fourth of that necessary for proper drainage and flood protection. Many outlet ditches have silted up and completely buried tile outlets. Many tile lines have been neglected and tiles have become filled up, broken, and have become absolutely ineffective. Levees have become overgrown with brush and vegetation and have become weakened by groundhogs and other rodents."

To again quote Mr. Sutton: "We have had a series of dry years and the damages to crops due to inadequate maintenance have not been nearly so severe as would have been during a series of wet years."

Under Mr. Sutton's direction valuable assistance is being given farmers through work on the improvement of public drainage enterprises by Civilian Conservation Corps Camps.

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The Individual Farmer's Problem

Entirely aside from the benefits enjoyed by farmers whose drainage problems are taken care of by drainage district projects, are the cases of many thousands of those who must provide drainage for their farms without any outside assistance.

To the farmer is left the choice of three methods. They are: (1) manual, (2) mechanical, and (3) blasting. Any of these may be used either for making new ditches or cleaning out existing ones.

Hand work is slow and, in the end, costly. The use of mechanical equipment is not always practicable; especially where the soil is very wet and it is difficult to move equipment over it to the work. Blasting offers the advantages of speed in doing the work, a minimum of labor, comparatively low cost -- all factors considered -- and high efficiency. Dynamite makes available great power of extreme mobility. It can be taken anywhere a man can go, which, very often, is where a machine can not be taken.

Of particular interest to the agricultural engineer or the farmer when such conditions as the present ones prevail, with a great excess of water retarding cultivation and seeding, is the fact that the wetter the ground the more effective dynamite is for ditching or clean-out work. The obvious reason for this is that an abundance of water makes possible the perfect propagation of a dynamite blast.

All experienced users of explosives know that water in the ground is essential to the travel of the detonation wave which is set up by the explosion of a primed stick of dynamite in one of the holes. It is also a well known fact that this detonation wave explodes, in turn, the dynamite in holes of a line of any length, whether a few feet or hundreds of feet. The effect is that of a simultaneous explosion of all holes. Such a blast is commonly called a "propagated" one.

Blasting by the shooting of single holes would give a series of craters with the shape of an inverted cone. When the propagated method is followed, the craters overlap. Thereby a good ditch is provided and, ordinarily, one of uniform depth and width. Seldom is it necessary to remove any material, mechanically or manually. A properly loaded ditch blast avoids spoil banks.

Blasters Must Exercise Care

Ditching with dynamite may be done without danger to the blaster. It is necessary, however, that any one handling explosives be thoroughly familiar with the work, and that he understands and strictly observe safety practices.

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MEXICAN GOVERNMENT PREPARES INSECT CHART SHOWING THE MOST SERIOUS PESTS OF FRUITS

The Agricultural News Letter is happy to acknowledge receipt of a large lithographed poster, in colors, giving the pictures and details of the principal insects which attack fruit in Mexico. The color illustrations of the various insects are made in large size so that study of them is made easy. In addition, the poster contains data concerning the distribution of these insects and the fact that the Government of Mexico is beginning an energetic campaign against them. A statement of the steps being taken by the Government is printed on the poster.

The Government is issuing the poster through the Departamento de Sanidad Vegetal, Direccion de Agricultura, de la Secretaria de Agricultura y Fomento, San Jacinto, D. F., Mexico. This department of the Mexican Government states that any one desiring more details or information should address their communications to it.

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